



# SHARE MARKET PREDICTION USING ARTIFICIAL NEURAL NETWORK

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## ABSTRACT

The share market is dynamic in nature that means to predict share price is very complex process by general prediction or computation method. Its main reason is that there is no linear relationship between the market parameters and target closing price, so use of Neural Network is a choice of interest for share market prediction. Apart from Neural Network the proposed system consists of three more algorithms: Regression, Forecasting and Moving average. Using these algorithms, the basic idea behind this system is to predict the future share values based of the past values. Also, use of these algorithms leads the system to result in better output as well as increases the efficiency.

**KEYWORDS:** Share, BSE, Sensex, Closing price, Past data.

## I. Introduction

Artificial Neural Network plays important role in time series analysis and prediction. Share market prediction is one of complicated problem because it is dynamic in nature i.e. sensex value is consistently changing. Hence it is very difficult to identify the patterns and predict the share value. Existing system are not well efficient because of dynamic nature of share market. In this paper we are trying to improve accuracy of share market prediction using four different algorithms as Neural network, Regression, Forecasting and Moving Average. Using this four algorithms we will try to improve accuracy of existing system from 20%-30% to 50%-60%. This will help share broker and customer to purchase or sell the share and to invest money.

## II. Literature survey

In the Literature survey we are analyzing four papers which contains different methods or models like moving average, Forecasting, Neural network and Regression algorithm. We are trying to cover all these methods or algorithms to obtain better accuracy than existing systems.

### A. Artificial Neural Networks for Forecasting Stock Price (2008):

According to This paper The objective is to be able to develop a long term pricing relationship between stocks and profit. Statistical arbitrage strategies have always been popular since the advent of algorithmic trading. In particular, Exchange traded fund (E.T.F.) arbitrage has attracted much attention. Trading houses have tried to replicate ETF arbitrage to other stocks. Thus, the objective is to be able to develop a long term pricing relationship between stocks and profit from their divergence from this relationship. In this paper, we have developed a feasible trading strategy on this concept. Artificial neural networks have been deployed to model the pricing relationship between elements in a sector. All prices have been considered at the same instant, thereby allowing us to make trading decisions in accordance with our predictions. Supervised learning algorithms have been used to train the network.

### B. Stock Market Prediction Using Artificial Neural Networks (2012):

According to this paper the authors, the aim of this project is implementation of neural networks with back propagation algorithm for stock market. Borrowing from biology, researchers are exploring neural networks - a new, non algorithmic approach to information processing. A neural network is a powerful data-modeling tool that is able to capture and represent complex input/output relationships. The motivation for the development of neural network technology stemmed from the desire to develop an artificial system that could perform "intelligent" tasks similar to those performed by the human brain.

### C. Performance Analysis of Indian Stock Market Index using Neural Network Time Series Model (2013):

According to this paper, A time series is a collection of observations made chronologically. The nature of time series data includes: large in data size, high dimensionality and necessary to update continuously. Forecasting based on time series data for stock prices, currency exchange rate, price indices, etc., is one of the active research areas in many field viz., finance, mathematics, physics, machine learning, etc. Initially, the problem of financial time sequences analysis and prediction are solved by many statistical models. During the past few decades, a large number of neural network models have been proposed to solve the problem of financial data and to obtain accurate prediction result. The statistical model integrated with ANN (Hybrid model) has given better result than using single model. This work discusses some basic ideas of time series

data, need of ANN, importance of stock indices, survey of the previous works and it investigates neural network models for time series in forecasting.

### D. Forecasting of Indian stock market using time-series ARIMA Model (2014):

According to this paper an application of ARIMA model based on which we predict the future stock indices which have a strong influence on the performance of the Indian economy. The Indian Stock market is the centre of interest for many economists, investors and researchers and hence it is quite important for them to have a clear understanding of the present status of the market. To establish the model author applied the validation technique with the observed data of sensex of 2013.

## III. Existing System

Stock market prediction is an act to determine future stock value (share price). This prediction takes place by taking the past share values in to consideration. For this the existing system makes use of algorithms such as ANN (Artificial Neural Network), ARIMA model, Time series prediction etc. Efficiency of these algorithms is less as compare to the proposed system algorithm. There is no such a system which makes use of four algorithms in one system. Hence that leads the existing systems to be less efficient.

## IV. Proposed System

We use artificial neural network methods like Forecasting, Linear regression, and Moving averages. In forecasting method the system is taking the three days last and the current year stock portfolio closing price from the predicted date and performs calculations on it for predicting the stock portfolio price. Moving averages method, system is take the ten days stock portfolio closing price form the predicting date and calculate the stock price.

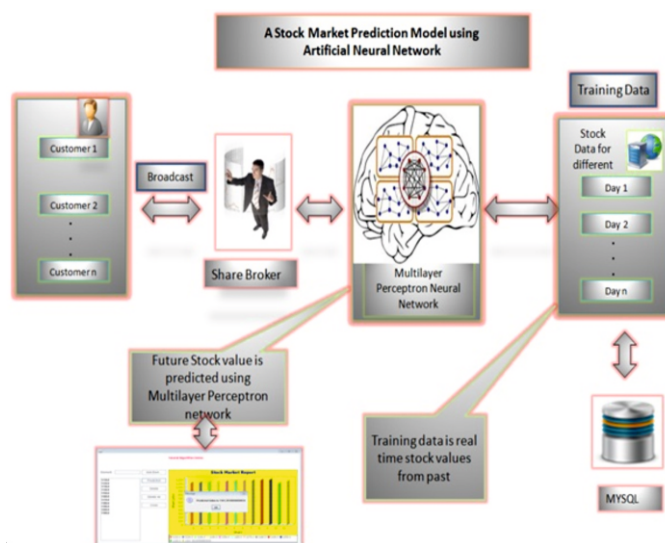


Figure 1. System Architecture

In this method a alpha is set for the predicting value it is a constant for this method. Regression method, it is a statistical assessing the association between two variables. It is used to find relationship between two variables. Neural networks method has effective, general purpose approach for pattern recognition, classification, and clustering and especially time series prediction with a great degree of accuracy. Nevertheless, their performance is not always satisfactory. Back propagation algorithm is the best algorithm to be used in Feed forward neural network because it reduces an error between the actual output and desired output in a gradient descent manner.

## V. Algorithms

### A. Moving Average Algorithm

Get the last n records stock value from predicted date

1. Calculate Value for add  
add=actualValues[0]+(5\*(actualValues[0]/100));
2. Calculate Pre-Assume value  
preassume=actualValues[0]+add
3. Set static value alpha  
alpha=0.7
4. Set one fix predicted value
5. predictedvalues[0]=preassume+(alpha\*(actualValues[0]-preassume));
6. Apply the formula for Prediction  
predictedvalues[i+1]=predictedvalues[i]+(alpha\*(actualValues[i+1]-predictedvalues[i]));

### B. Regression Algorithm

1. Take a past few close values from any company. That is  $y_i$  and take constant values that is  $x_i$
2. Calculate the slop i.e.  $b = \Sigma [(x_i - x)(y_i - y)] / \Sigma [(x_i - x)^2]$
3. Calculate intercept i.e.  $a = y - b_1 * x$
4. Now calculate  $(Y) = a + bX$  and here we got value of dependent variable.
5. Calculate the coefficient of determination. That is  $R^2 = \{ (1/N) * \Sigma [(x_i - x) * (y_i - y)] / (\sigma_x * \sigma_y) \}^2$
6. For calculating coefficient of determination we need  $\sigma_x, \sigma_y$ .
7. So firstly calculate  $\sigma_x = \sqrt{\Sigma (x_i - x)^2 / N}$  then  $\sigma_y = \sqrt{\Sigma (y_i - y)^2 / N}$ .
8. Coefficient of determination gives us variation of dependant variable and relation among the dependant variable and independent variable.

### C. Forecasting Algorithm

1. Forecast calculation  
Take the last & current year stock price.  
Eg. Last year = L1,L2,L3..  
Current year = C1,C2,C3..
2. Calculate summation of stock prices.  
Sum1=L1+L2+L3  
Sum2=C1+C2+C3
3. Calculate pf.  
pf=(Sum1/Sum2)
4. Calculate sn using formula 1.  
sn=n1+n2+n3  
Here n1,n2,n3 are stock values of current year multiplied by pf.
5. Finally calculate Percent Of Accuracy  
POA= sn / pn \* 100 where pn is summation of current year stock value.
6. If POA > 105 then add alpha value Else subtract alpha value.  
Where alpha value = 0.7

### D. Neural Network Algorithm

1. Get the stock data training set
2. Calculate the Linear Regression factor on stock closing value  
lrFactor=(rfactor/y.length)\*100.0D  
rfactor=rfactor+Math.abs(diff/y[j]), Here, y[j] is the stock close values set  
diff=y[j]-(aX+bX\*x[j])  
bX=sum1/sum2  
aX=ym-bX\*xm

3. Then subtract the Linear Regression from set  
ytmp = lr.subtractLinearRegression(null, ytmp), Here, ytmp is the copy of original set

4. Apply the fourier analysis on the set  
interval1=fa.transform(ytmp);
5. After processing on data, normalize the data by dividing by constant value
6. Creates new Multi LayerPerceptron with specified number of neurons in layers  
MultiLayerPerceptron(TransferFunctionType transferFunctionType, int..neuron  
sInLayers)
7. Provides implementations of specific neural network learning algorithm  
MomentumBackpropagation learningRule=((MomentumBackpropagation)  
neuralNet.getLearningRule())
8. Set learning algorithm for this network  
public void setLearningRule(LearningRule)
9. Performs calculation on whole network  
public void calculate()
10. Returns network output vector  
public double[] getOutput(), Output vector is an array collection of Double values

## VI. Advantages

1. Dynamic in nature.
2. High Accuracy.
3. Noise Tolerance.
4. Ease of maintenance.
5. Share broker can increase his/her and customer's profit by predicting stock value.

## VII. Disadvantages

1. Problem in updating of data.
2. Previous systems cannot predict the share market values efficiently

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